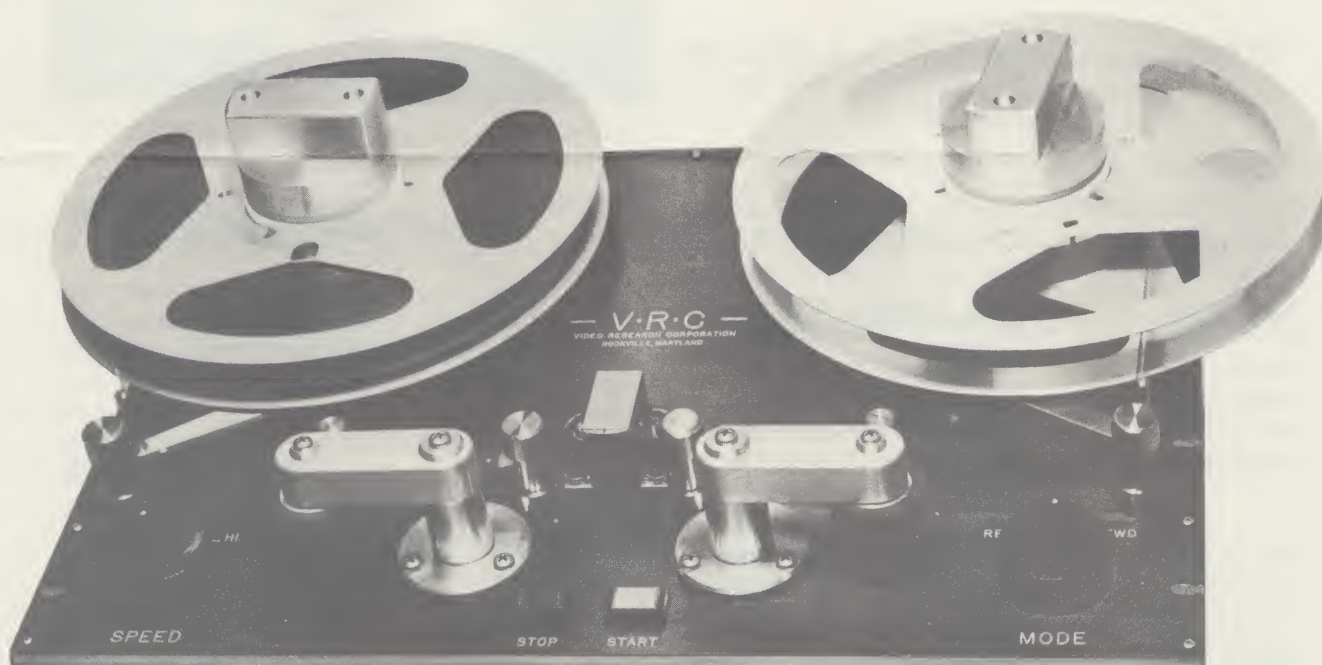


MAGNETIC TAPE TRANSPORT

—V·R·C—

MODEL VR-4

FOR DEVELOPMENT OF CUSTOM RECORDING SYSTEMS



The VR-4 is a flexible high precision magnetic tape transport mechanism for those desiring to add their own heads and signal electronics. Its low cost makes it feasible to develop custom recorders for special applications at less than the purchase cost of the more elaborate general purpose instrumentation machines.

The basic deck is supplied with a variety of options - including bi-directional capability - to satisfy nearly any analog or digital performance requirement. Head mounts are pre-drilled to accept standard head stack configurations available from most magnetic head manufacturers.

The transport features a dual-differential capstan drive system with "TRI-BELT" flutter filter, and achieves performance equal to many larger more expensive instrumentation machines. Tape speeds are available from 15/16 ips to 120 ips, and the unit accommodates 10-1/2 inch standard NAB reels of 1/4, 1/2, or 1 inch wide tape.

The recorder mounts in any standard 19 inch rack with no special adaptors or bracing. It weighs less than 60 lbs. and measures just 19" x 14" x 12", making it ideal for portable use.

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SPECIFICATIONS

Model VR-4 Magnetic Tape Transport

Tape Speeds	120, 60, 30, 15, 7½, 3¾, 1⅞, and 15/16 ips – adjacent pairs electrically switchable.	Tape Motion.....	Left to right standard, right to left or bidirectional optional
Tape	¼, ½, or 1 inch wide 1.0 or 1.5 mil base	Braking System	Regenerative mechanical – fail safe
Reels	Standard NAB hubs up to 10½ inch dia.	Drive System	Dual differential capstans with "TRI-BELT" flutter filter
Speed accuracy	±0.5% referenced to line frequency	Control System	All electrical with remote control capability and interlocked to preclude tape damage in any sequence
Flutter	120 ips 0.6% p-p .2cps - 10kc. 60 ips 0.6% p-p .2cps - 10kc. 30 ips 0.8% p-p .2cps - 5.0kc. 15 ips 1.0% p-p .2cps - 2.5kc. 7½ ips 1.0% p-p .2cps - 1.25kc. 3¾ ips 1.2% p-p .2cps - 625cps 1⅞ ips 1.5% p-p .2cps - 313cps 15/16 ips 1.8% p-p .2cps - 313cps	Control Functions.....	OFF, HI-SPEED, LO-SPEED, FORWARD, REVERSE, DRIVE, START, STOP
Dynamic Skew	Less than 1 microsecond between adjacent tracks on the same head stack at 120 ips	Rewind Time	90 seconds maximum for 10½ inch reel of 1.5 mil tape
Start Time	120 ips 16 seconds maximum 60 ips 8 seconds maximum 30 ips 4 seconds maximum 15 ips 2 seconds maximum 7½ ips 1 second maximum 3¾ ips 0.5 second maximum 1⅞ ips 0.5 second maximum 15/16 ips 0.5 second maximum	Tape Sensor.....	Cutoff switch stops transport at end-of-reel, broken tape, or improper threading
Stop Time	120 ips 6 seconds maximum 60 ips 4 seconds maximum 30 ips 2 seconds maximum 15 ips 1 second maximum 7½ ips 0.5 second maximum 3¾ ips 0.5 second maximum 1⅞ ips 0.5 second maximum 15/16 ips 0.5 second maximum	Heads	Mounts from 1 to 4 head stacks (not furnished)
		Connector	Bracket furnished for Winchester type 34S connector for terminating head
		Power	117 VAC, 60 CPS, 180Watts
		Dimensions	19" W x 14" H x 12½" D. Std. rack mounting.
		Weight.....	60 lbs. nominal
		Environment.....	Temperature 0 to 50° C operating Altitude 10,000 ft. Humidity 90% with condensation Vibration and Shock – normal handling

– specifications subject to revision without notice –



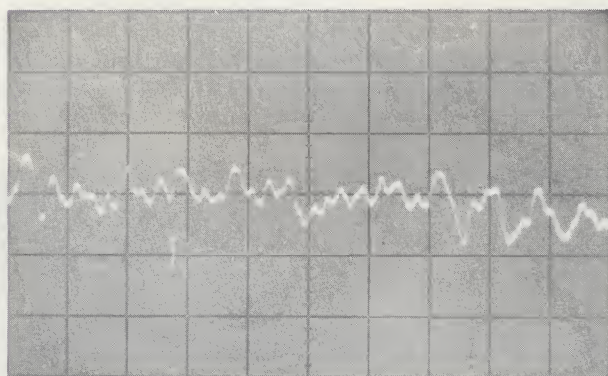
The capstan differential action is obtained through transfer of tension gradients from the compliant belts rather than actual differences in speed. The mechanism therefore, is basically symmetrical providing bidirectional capabilities and eliminating the need for elaborate reel tension servos.

APPLICATIONS OF THE VR-4 TAPE TRANSPORT MECHANISM

GENERAL DESIGN FEATURES

High precision at low cost is achieved by eliminating many of the "Gingerbread" features usually found in instrumentation-class transports, while retaining a basic ruggedness and reliability. There are no footage counters, balky servos, or vacuum systems which add cost, but offer little performance improvement. Nor are there stamped thin metal levers, fabric cords, or plastic actuators or other delicate components to deteriorate with use. The VR-4 will retain its original specifications over long periods of continuous field service with little or no maintenance.

Powered by 4 AC motors, the transport uses a dual-differential capstan open loop drive system which has many of the advantages of a closed loop system as well as some unique features of its own, such as: isolation from reel tension perturbations, better tape-to-head contact with lower tape stress, and simpler threading. The drive system uses a compliant belt technique which acts as a flutter filter and makes it possible to employ smaller flywheels. This is one reason for the VR-4s high performance-to-weight ratio.



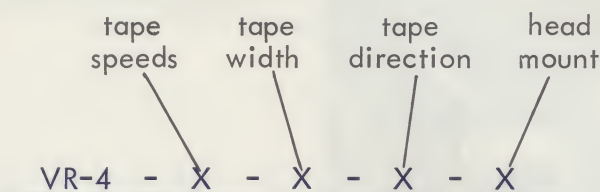
Flutter waveform of the VR-4 at 60 ips
Vertical scale is 0.3% per division

- **TELEMETRY AND DATA RECORDING** – Compact data acquisition systems using direct baseband or predetection techniques for permanent installations, or portable checkout are easily configured around the VR-4. Instrumentation quality wide-band or FM systems performance is possible with the low flutter and high stability of this transport.
- **DIGITAL DATA HANDLING** – The VR-4 is ideal for serial or parallel digital applications because of its low dynamic skew and bidirectional features.
- **HIGH SPEED TAPE COPYING** – The 60 and 120 ips capability lends itself to high-production copying of audio tapes with a pair of VR-4s. The dual capstan system maintains even tape-to-head contact so that copies are accurate reproductions of the master tape. Speed stability is comparable with the finest instrumentation machines.
- **MULTICHANNEL AUDIO** – For special effects use in broadcast and sound studios it is possible to record 32 channels on 1 inch tape with standard heads. This density is feasible because of the low skew of the VR-4. The open loop capstans also make threading and editing simple.
- **VIDEO RECORDING** – With a linear speed of 120 ips and microgap heads video information up to 2Mc can be recorded and reproduced. Low flutter at this speed contributes to sync stability.
- **AUDIO MONITORING** – At 15/16 ips a 10½ inch reel of tape will run continuously for 12 hours. The bidirectional feature of the VR-4 can then be used for 24 hours of unattended recording time.
- **EXPERIMENTATION** – Development and testing of special heads, electronic systems, or tape characteristics with minimal investment yet high precision is practical due to the more than 250 possible configurations of the VR-4 tape transport.

ORDERING INFORMATION

To specify a specific tape transport configuration, select the appropriate characteristics from the tables below and insert the proper model designator as shown.

Model number composition:



TAPE SPEEDS		MODEL DESIGNATOR	TAPE WIDTH		MODEL DESIGNATOR
hi - lo			1 inch		100
120	- 60 ips	A	½ inch		050
60	- 30 ips	B	¼ inch		025
30	- 15 ips	C	TAPE DIRECTIONMODEL DESIGNATOR right - leftRL left - rightLR bidirectionalBI		
15	- 7½ ips	D			
7½	- 3¾ ips	E			
3¾	- 1⅞ ips	F			
1⅞	- 15⁄16 ips	G			
HEAD MOUNTING PLATE*			MODEL DESIGNATOR		
length	width	thickness			
2"	2"	3⁄16"	for single head stack		SH
3"	2"	3⁄16"	for double head stacks (IRIG spacing)		DH
5"	2½"	3⁄16"	for triple head stacks		TH
6"	2½"	3⁄16"	for quadruple head stacks (IRIG spacing)		QH
*VRC will drill and tap precision head mounting plates to accept most head stacks at no additional cost.					

EXAMPLE --- Model no. VR-4-C-050-LR-TH defines a VR-4 tape transport equipped for speeds of 30 and 15 ips and to be used with 1/2 inch tape. The reel on the left functions as the supply reel and the reel on the right is the take-up. The head mounting plate and guide spacing are designed for 3 separate head stacks.

NOTE: VRC will be pleased to quote on special heads and electronics (including FM and AM carrier systems) for use with the VR-4.

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